REMARKS

Reconsideration and allowance are respectfully requested in light of the above amendments and the following remarks.

Claims 5-10 remain pending in the application. Of these, claims 5 and 6 have been amended to clarify the claimed subject matter. Each of the pending claims is believed to define an invention that is both novel and non-obvious over the prior art. Favorable reconsideration of this case is respectfully requested.

Claims 5-10 stand rejected, under 35 USC §103(a), as being unpatentable over Shen (US 6,327,302) in view of Ionescu et al. (US 6,295,289). These rejections are respectfully traversed.

A feature of the present invention is that a communication terminal apparatus performs equalization on received data while updating tap coefficients using, as an initial value, a tap coefficient obtained in a base station apparatus in association with an uplink signal from the communication terminal apparatus. In other words, a feature of the present invention is that the communication terminal apparatus performs equalization using a highly accurate tap coefficient, which is sent from a base station apparatus as an initial value. Therefore, the communication terminal, itself, need not calculate the initial value of the tap coefficient. This feature provides the advantage of reducing the calculation load and thus the processing time with respect to the

equalizing operation performed by the communication terminal apparatus.

More particularly, claim 5 recites:

> *a base station apparatus that transmits a downlink signal containing a tap coefficient obtained in association with an uplink signal; and*
>
> *a communication terminal apparatus that transmits said uplink signal to said base station apparatus, receives said downlink signal from said base station apparatus, performs equalizing on data contained in the downlink signal while updating tap coefficients using, as an initial value, said tap coefficient transmitted in said downlink signal from said base station apparatus.*

Claim 8 recites:

> *operating a communication terminal apparatus to receive a downlink signal containing a tap coefficient from a base station apparatus and to start an equalizing operation on received data in said downlink signal after receiving said tap coefficient contained in said downlink signal from said base station apparatus, and*
>
> *operating the base station apparatus to obtain said tap coefficient in association with an uplink signal transmitted from the communication terminal apparatus.*

The features recited by independent claims 5 and 8 provide the advantage of enabling the ability to follow the changes of a propagation environment and effectively equalize the distortion that a signal receives in a propagation path (page 6, lines 8-13). As described with respect to the non-limiting embodiment of the invention described in the present application, this is accomplished by shifting some of the operational load of the

remaining lines of the cited portion, Shen discloses the objects of his invention: to provide an adaptive equalizer having less complexity than conventional designs and a fast convergence property (col. 2, lines 48-54), to provide a fast adaptive algorithm that can be applied to both a linear equalizer and a decision feedback equalizer (col. 2, lines 55-57), to provide a fast adaptive algorithm with a level of complexity and structural simplicity that is to close to that of conventional designs, while providing a channel equalization technique that has a desirable level of accuracy and low implementation cost (col. 2, lines 58-63), and to utilize time-varying convergence parameters in the adaptive algorithm to achieve the fast convergence property and minimize the error signal (col. 2, lines 64-67).

Fig. 2 of the Shen reference, which is cited in the Office Action, illustrates a fast adaptive decision feedback equalizer 30 comprising a channel estimator 301a, a forward FIR filter 305, a backward FIR filter 306, two fast adaptive algorithm modules 400, a decision device 320, and two summers (col. 3, lines 49-59).

Moreover, Shen's entire disclosure fails to teach or suggest anything relating to a "base station," a "station," or "downlink." Shen uses the word "forward" only in connection with the forward FIR filter, and a "forward equalizer." The word "link" is used only in the context of the environmental conditions that "increase

equalization processing, with respect to establishing an initial value of an equalizer's tap coefficients, from the communication terminal to the base station (page 6, lines 14-22).

In contrast to the present invention, Shen relates to achieving a fast convergence in an equalizer utilizing time-varying LMS step sizes.

The Office Action proposes that Shen teaches "a base station apparatus that transmits a downlink (304) signal containing a tap coefficient obtained in association with an uplink (303) signals (col. 2, lines 36-67, fig. 2)" (Office Action page 3, lines 1-4).

However, the Applicants submit that neither the cited portion of Shen nor any other part of the reference discloses the transmission of a downlink signal containing a tap coefficient. Additionally, the Applicants submit that nowhere in the Shen reference is there a disclosure of transmitting a tap coefficient or transmitting a tap coefficient obtained in association with uplink signals.

In the portion cited in the Office Action, Shen discloses an adaptive equalizer design that utilizes a fast adaptive algorithm (col. 2, lines 36-41). This adaptive equalizer is used for personal wireless telecommunication, digital enhanced cordless telecommunication, wireless Local Loop communication, and other cellular communication systems (col. 2, lines 41-47). In the

the difficulties of maintaining a quality communication link" (col. 1, lines 22-24). Shen does not describe an "uplink," "downlink," "forward link" or "reverse link." Therefore, it follows that Shen does not disclose a base station apparatus that transmits a downlink signal containing a tap coefficient obtained in association with an uplink signal.

The Office Action alleges that reference numeral 303 of Shen identifies uplink signals and reference numeral 304 identifies a downlink signal. However, the Applicants note that (1) Shen identifies reference numeral 303 as an "output signal y(k)" of equalizer 30 that is fed back to the backward FIR filter as an input signal (col. 3, lines 49-56)and 920 Shen identifies reference numeral 304 as a "received signal x(k)," which is used as the input signal to the forward filter 305 (col. 3, lines 49-56).

The Office Action states that Shen discloses at col. 4, lines 28-60 and col. 6, lines 50-65, a communication terminal apparatus that transmits an uplink signal 303 to a base station, receives a downlink signal 304, performs equalization on data contained in the downlink signal while updating tap coefficients using, as an initial value, a tap coefficient transmitted in the downlink signal 304 (Office Action, page 3, lines 5-9 and page 4, first sentence of second paragraph, with respect to method claim 8). However, the Applicants note that, as discussed above, Shen does not disclose

transmitting a tap coefficient to a communication terminal for use in equalization, as recited in claims 5 and 8. Moreover, Shen fails to disclose transmitting a tap coefficient to a communication terminal for use as an initial value in equalization, as recited in claim 5.

Shen discloses, in column 4, lines 28-60, utilizing time-varying convergence parameters in a fast adaptive equalizer to improve the convergence properties of the equalizer. This is accomplished by selecting "initial values of convergence parameters for the forward and backward filter coefficients ... such that the adaptive process is stable and channel tracking is performed by updating the forward and backward filter coefficients of the adaptive decision feedback equalizer 30" (emphasis added) (Shen, col. 4, lines 42-47).

The Applicants note that the convergence parameters disclosed by Shen are parameters used for updating tap coefficients and not tap coefficients themselves. Moreover, Shen only discloses that the initial values of these convergence parameters are "selected such that the adaptive process is stable." Shen fails to disclose any specific method to select the initial values and does not teach the present claimed features of transmitting by a base station a tap coefficient to a communication terminal for use as an initial value in equalization.

The other portion of Shen cited in the Office Action (col. 6, lines 50-65) summarizes the benefits provided by Shen's invention. For example, Shen states that his invention improves the convergence behavior of prior art equalizers by using variable step sizes (col. 6, lines 50-53). Shen states that his invention is simpler than conventional equalizers and is desirable in applications where fast channel tracking is important (col. 6, lines 53-60). Shen also states that his invention is only slightly more complex than conventional equalizers and can be applied to channel estimation and channel tracking designs of the decision feedback or linear equalizer type (col. 6, lines 60-65).

The Office Action alleges that Ionescu discloses a "base station (uplink, downlink signal, tap coefficient, use within the system) (for example, col. 7, lines 47-65, figs. 1-5)" (Office Action, page 3, lines 12-14, and page 4, last full sentence, with regard to claim 8).

In response, the Applicants respectfully submit that the fact that Ionescu may disclose the words and phrases "base station," "uplink," "downlink," and "tap coefficient" does not provide any disclosure that would cure the above-noted deficiencies of Shen.

In the cited portion, Ionescu discloses calculating multiple values of a predicted uplink channel signal strength, $C_{u\text{-}est}[n]$, during the time period between receiving an uplink signal (power

control group) at a base station and the return of corresponding power control information (col. 7, lines 43-46). Because of the delay in processing and communicating the power control information, which is received at the mobile unit at time [n], a subset of the communicated $C_{u\text{-}est}[n]$ values may have been calculated by the base station based on an uplink power control group whose transmission to the base station ended at some earlier time [n-2] (col. 7, lines 46-56). When the power control information is received at the mobile unit, each stored $C_{u\text{-}est}$ value may be modified based on whether it was calculated before or after the expiration of a base station signal observation interval, which is used to modify the uplink signals (col. 7, lines 57-62). $C_{u\text{-}est}$ values calculated before the observation interval may be modified using a backward error correction, while $C_{u\text{-}est}$ values determined after the observation interval may be modified using a forward error correction (col. 7, lines 62-65).

In summary, Ionescu discloses a base station that calculates a predicted uplink channel signal strength, $C_{u\text{-}est}[n]$, based on a power control group that is transmitted to the base station. Thereafter, the base station communicates corresponding power control information to the mobile unit.

It is apparent that Ionescu bears little or no pertinence to the present claimed invention.

From the above discussion, it is submitted that the applied references, considered alone or together, fail to disclose or suggest the instant claimed features of *inter alia* (1) transmitting from a base station apparatus to a communication terminal apparatus a downlink signal which includes a tap coefficient for use by the communication terminal apparatus in starting an equalizing operation on received data in the downlink signal (claim 8), and (2) a radio communication system including a base station apparatus and a communication terminal apparatus, wherein the communication terminal apparatus transmits an uplink signal to the base station apparatus, the base station apparatus transmits, to the communication terminal apparatus, a downlink signal including a tap coefficient obtained in association with the uplink signal, for use by the communication terminal apparatus as an initial value to perform equalizing on data contained in the downlink signal (claim 5). Therefore, the Applicants submit that independent claims 5 and 8 are allowable over the teachings of the applied prior art. The Applicants further submit that claims 6 and 7 (which depend from claim 5) and claims 9 and 10 (which depend from claim 8) are allowable due to their dependence from an allowable independent claim and also due to their recitation of subject matter that departs even farther from the teachings of the prior art.

In light of the foregoing, it is respectfully submitted that the present application is in condition for allowance, and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

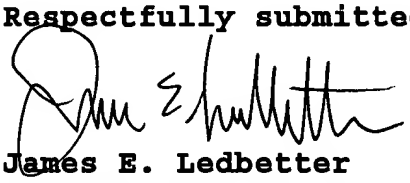

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Exhibit I

5. (Amended) A radio communication system comprising:

a base station apparatus that transmits a downlink signal containing a tap coefficient obtained in association with an uplink signal; and

a communication terminal apparatus that transmits said uplink signal to said base station apparatus, receives said downlink signal from said base station apparatus, performs equalizing on data contained in the downlink signal while updating tap coefficients using, as an initial value, [the] said tap coefficient transmitted in said downlink signal from [the] said base station apparatus.

6. (Amended) A communication terminal apparatus for use in a radio communication system according to claim 5, the communication terminal apparatus comprising:

a receiver that receives the downlink signal containing the tap coefficient obtained in the base station apparatus in association with the uplink signal; and

an equalizer that performs said equalizing on data contained in the downlink signal received [in] by the receiver, according to an adaptive algorithm for updating tap coefficients using, as said

initial value, the tap coefficient received in said downlink signal.